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AUTHOR Varnhagen, Connie K.; And Others
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ABSTRACT

A study investigated children's recall and representation for multiple episode stories differing in terms of goal structure. Subjects were 36 third and fifth grade students reading below grade level, and 48 students from the same grades who were identified as average readers. The students read or listened to stories containing embedded and sequential goal structures. Comprehension was assessed through recall and "why" questions. Results showed that average fifth grade readers had greater recall than did the third grade and less skilled readers. The older, more skilled readers' representations tended to resemble the hypothesized goal structures, while the younger and less skilled readers' representations for both goal structures contained embedded goals. (FL)

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Individual Differences in Comprehension of Multiple Episode Stories

Connie K. Varnhagen, Janelle B. Hartwig, and Susan R. Goldman

University of California at Santa Barbara

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Individual Differences in Comprehension of Multiple Episode Stories

Narrative text has recently been described in terms of how people comprehend and represent goals. Hierarchically-related goal-subgoal structures have been posited to underlie narrative events (cf. Lichtenstein & Brewer, 1980; Graesser, 1978; Rumelhart, 1977) and there has been moderate support for the hypothesis that people use a goal schema to comprehend and represent narrative information. For example, Lichtenstein and Brewer (1980) have shown that actions related to goal accomplishment are better recalled than non goal-related actions. In addition, Graesser (Graesser, 1978; Graesser, Robertson, Lovelace, & Swinehart, 1980; Graesser, Robertson, & Anderson, 1981) has shown that recall of actions in narratives is greater the further up they are in the goal-subgoal hierarchy.

The present study addresses similar issues of how people comprehend and recall goals and goal-related actions. We examined children's recall and representation of stories differing in terms of their goal structure. We constructed two types of story structures, each containing three episodes that are well-formed in terms of a Stein and Glenn (1979) story grammar. In the Embedded structure, the goals of the three episodes are nested in each other in a subgoal or in-order-to type of relationship. In other words, to meet the goal, subgoals are generated. These subgoals represent the components of the larger solution. Subgoals must be met before their higher order goal can be met. This embedding relationship is shown in figure 1. In the embedded stories, an Initiating Event and Internal Response lead to the formation of the highest order story goal. This is immediately followed by a second Initiating Event and Internal Response leading to the formation of Subgoal 1. This subgoal is then followed by

the events that lead to the formation of Subgoal 2. The second subgoal is accomplished in the Attempt-Consequence sequence. This allows the Attempt-Consequence of Subgoal 1. The accomplishment of Subgoal 1 allows the Attempt and accomplishment of the highest order goal of the story. In the Sequential structure, on the other hand, the goals are linearly organized. This relationship is also shown in figure 1. The accomplishment of each goal is relatively independent of the accomplishment of the following goal. Note, however, that the accomplishment of the goals of episode 1 and 2 sets up conditions that enable the next episode to occur. Although the relationship among the goals differs for the two types of structures, the stories were written in a way that maintains semantic equivalency of the story category information. This semantic equivalence among the goals of our stories is shown at the bottom of figure 1.

Insert figure 1 about here

We hypothesized several age- and skill-related differences in comprehension of the two types of goal structures. Based on their exposure to varied and more complex social and problem solving situations, we hypothesized that older children are more likely to access a more highly developed goal structure schema to guide comprehension. We also expected some skill-related differences. It has been posited that more skilled comprehenders have and/or use prior knowledge to a greater extent than their less skilled peers (Cromer, 1970; Grabe, 1979). Thus, we hypothesized that our relatively more skilled subjects would be better able to use their general knowledge about goal structures than our less skilled subjects. Furthermore, we hypothesized that our age- and skill-related differences would be

greater following listening to as opposed to reading the stories. Listening is an experimenter-paced task and doesn't allow for reinspection of the text as reading does (Black, Schwartz, & Lehnert, 1981; Goldman & Varnhagen, under review). As a result, listening may require more efficient schema operation to aid in encoding and comprehension. If younger and less skilled children are less efficient schema users, then the processing demands involved in the listening task might be expected to affect comprehension.

In order to investigate these hypotheses, third and fifth grade children of average and below average reading skill listened to or read one story of each type of goal structure. Thirty two third and 52 fifth grade children participated in the study. Children were classified into skill groups based on their District reading scores. Eight of the third graders and 28 of the fifth graders were characterized as reading one to two years below their grade level. These children comprised our Less Skilled groups. The remaining children scored at grade level on the District reading tests and comprised our Average groups. Because of their extreme difficulties in decoding, all of the Less Skilled third graders listened to the stories. Approximately half of the children in the remaining groups listened to and half read the each of the two story types. Following listening to or reading each story, the children recalled the story and answered "Why?" questions about the goal and attempt-consequence for each of the episodes.

Our analysis of these recall measures was somewhat disheartening. We found no support for our hypothesis of listening vs reading differences in our recall analyses. We were also unable to distinguish any story structure differences in recall. We did find evidence of both listening-reading and story structure differences in our "Why?" question analyses, however.

The recall data did show age- and skill-related differences: Average fifth grade children did have greater overall reproductive recall of the stories. They recalled approximately 44% of the presented propositions. Both of the Less Skilled groups and the Average third graders had comparable recall, approximately 30-33% of the presented propositions. However, there were no differences among the groups in terms of any additions to the presented story information. These results indicate a certain amount of consistency among the recall protocols of Less Skilled older children and younger, same reading level children. Thus, it seems that age and skill differences are closely related to reading level.

While our recall analyses failed to show the effects of structure, the children's responses to the "Why?" questions were sensitive to these differences in some interesting ways. We used the children's responses to the "Why?" questions to infer their representations for the stories. Responses were scored in terms of connections between story events.

We found essentially four types of relations among the story events. These are shown in figure 2: (1) Leads-to links in which the children indicated that one story event sets up the necessary conditions for successive events. For example, many children indicated that some initiating event or internal response leads to or sets up the conditions for the goal to be expressed. (2) In-order-to links in which one goal must be accomplished in order for another goal to be accomplished. For example, Subgoal 1 in the embedded stories must be accomplished before the Goal can be accomplished. (3) Accomplish and Enable links in which an action either directly or indirectly accomplishes the goal. For example, the attempt of an episode accomplishes the goal of that episode. (4) Remove links in

which an action, through accomplishing the goal, removes the conditions that originally led to goal formation. For example, the attempt-consequence removes the Initiating Event or emotion that led to the initial goal formation. The type and strength of these links, both within and across episodes allowed us to distinguish the ways in which the children represented the stories.

Insert figure 2 about here

All children responded similarly to the "Why?" questions for the embedded stories. All children did not, however, respond similarly for the sequential stories.

The embedded story representation is shown in figure 2. This is a combined representation for all children. We see that the children's representation closely reflects our hypothesized embedded structure for the stories. Thus, it seems that all children recognized and used the underlying embedded structure to represent the embedded episodes. Indeed, this schema seems to be so strong that attempt-consequence events were much more likely to be stated as accomplishing the next higher order goal in the story than their own within-episode subgoal: Nine percent of the children responded that the Attempt-Consequence to Subgoal 2 accomplishes Subgoal 2 but 60% responded across episodes; they also were more likely to associate the Attempt-Consequence to Subgoal 1 with accomplishing the highest-order goal.

The embedded representation is also reflected in the in-order-to links between the goal and subgoals. Subgoal 2 is explained as necessary for

Subgoal 1 in 58% of the cases. Similarly, Subgoal 1 is explained by the Goal in 65% of the cases. The Goal, being the highest-order goal, is generally explained by conditions set up by the Initiating Event or Internal Response leading to goal formation.

Our hypothesized goal structure for the sequential text has only loosely connected episodes. We thus expected fewer cross-episode links. And, in general, the sequential story representations do contain fewer cross-episode links than the embedded story representations. However, the sequential representations take on three different forms and within them there is a significant degree of difference in how the episodes are related.

First consider the representations of the Average fifth graders who read the stories. This representation is found in figure 3. For these children, the sequential stories consist of three unconnected episodes. There are no cross-episode links. This representation most clearly resembles our hypothesized goal structure of the sequential stories. In addition, it closely resembles the way adults represent these sequential stories (cf. Goldman & Varnhagen, 1981).

Insert figure 3 about here

In contrast, <u>after listening</u> Average fifth graders did not represent the sequential stories as completely separated episodes. Their representation, shown in figure 4, reveals that they tended to connect the second and third episodes through weak in-order-to and enable links. Thus, is appears that following the listening task, some of the Average fifth graders transformed the goal for the second episode into a subgoal for the goal of the third episode.

Insert figure 4 about here

This tendency to connect the sequential story episodes such that the separated goals become subgoals for subsequent episodes is even stronger for the younger and less skilled readers whether they listened or read. Both of the Less Skilled groups and the Average third graders produced similar representations. Their combined representation is shown in figure 5. Notice the cross-episode in-order-to and enable links connecting all three episodes. These children's representation of the sequential stories closely resembles their representation of the embedded stories although there is some attenuation in the extent of episode linkage. Although in our hypothesized goal structure of the sequential stories, the goal of one episode does not serve as a subgoal to the goal of a subsequent episode, these children represent it as such. Similarly, the children tend to see the attempt-consequence of one episode as enabling the subsequent goal. Thus, the younger and less skilled children seem to be forcing the sequential stories into a representation that better fits the goal structure for the embedded stories. This is true for both the experimenter-paced listening task and the self-paced reading task.

Insert figure 5 about here

Our embedded-goals schema closely resembles a general problem solving schema by which a task is accomplished through completing multiple subtasks. Children develop a general problem solving schema very early and

are presented with many opportunities to use it at school. This may explain why the embedded schema seems to predominate over the sequential schema such that it is often over-extended. Thus, the younger and less skilled children appeared to force sequential stories into embedded stories in their representations. In addition, the Average fifth graders, when faced with an experimenter-paced listening task of some complexity, apparently fell back on their embedded schema to represent the stories in memory. When the processing demands are not so great, as in the self-paced reading task, the older children seemed better able to use a less accessible sequential schema to represent the sequential story information.

In order to examine the degree of consistency between recall and answers to the "Why?" questions, we analyzed reproductive recall according to story category and episode. In a previous study (Goldman & Varnhagen, 1981), we found a high degree of correspondence between recall and representation with adult subjects. In the present study, the relationship between reproductive recall and story representation was inconsistent across episodes and type of story structure. In addition, none of the relationships were as strong as we had predicted from our adult findings (Goldman & Varnhagen, 1981). This lack of clear consistency between recall predictions and children's representations may have to do with what information children think is important to include in their recall. Assuming that others have a common representation of the story, children may neglect to mention what they feel is obvious or redundant information. Several of our studies have supported this notion (e.g., Goldman & Varnhagen, under review; Goldman & Varnhagen, 1981). This points out a need to more closely investigate the relationship between children's recall and their representations in order to discover the nature of children's production rules and

how they use them in their recall.

In conclusion, we would like to emphasize that younger and less skilled readers tend to use and overuse a very powerful embedded-goal schema to represent and comprehend the stories they are exposed to. Older and more skilled readers, on the other hand, appear to be somewhat more flexible in their schema utilization and tend to represent stories in a way that more closely resembles the goal structure of the text. Finally, all children, regardless of their age and skill, seem to assume that other people share a common story representation. As a result, they often delete obvious and/or redundant information from their recall.

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Figure Captions

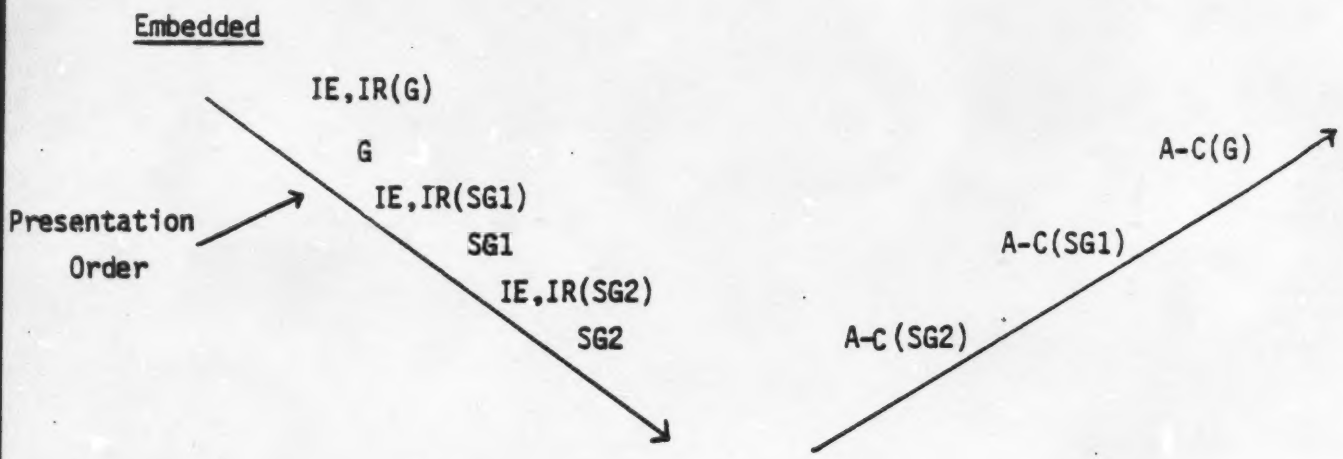
Figure 1. Structural representations for the stories.

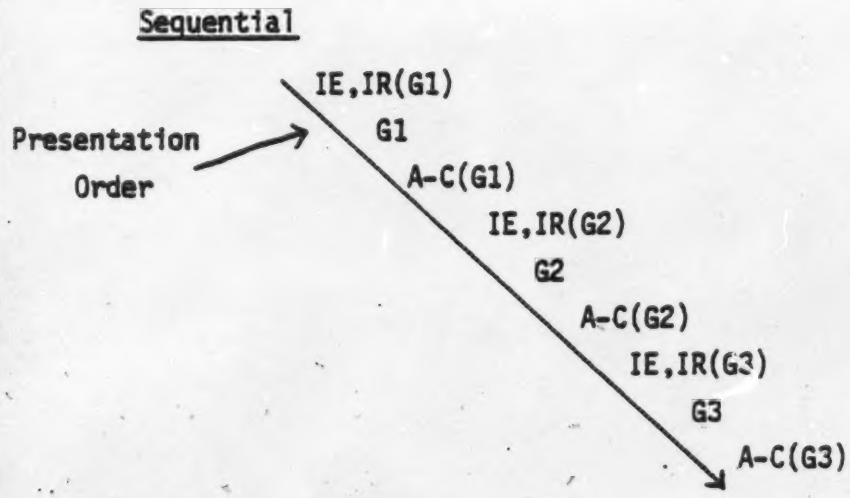
Figure 2. Representation for Embedded stories produced by all children. Combined across Listening and Reading.

Figure 3. Representation for Sequential stories produced by the Average fifth graders. Reading.

Figure 4. Representation for Sequential stories produced by the Average fifth graders. Listening.

Figure 5. Representation for Sequential stories produced by the Less Skilled third and fifth graders and the Average third graders. Combined across Listening and Reading.





KEY:

IE	Initiating Event
IR	Internal Response
G	Goal
SG	Subgoal
A-C	Attempt-Consequence

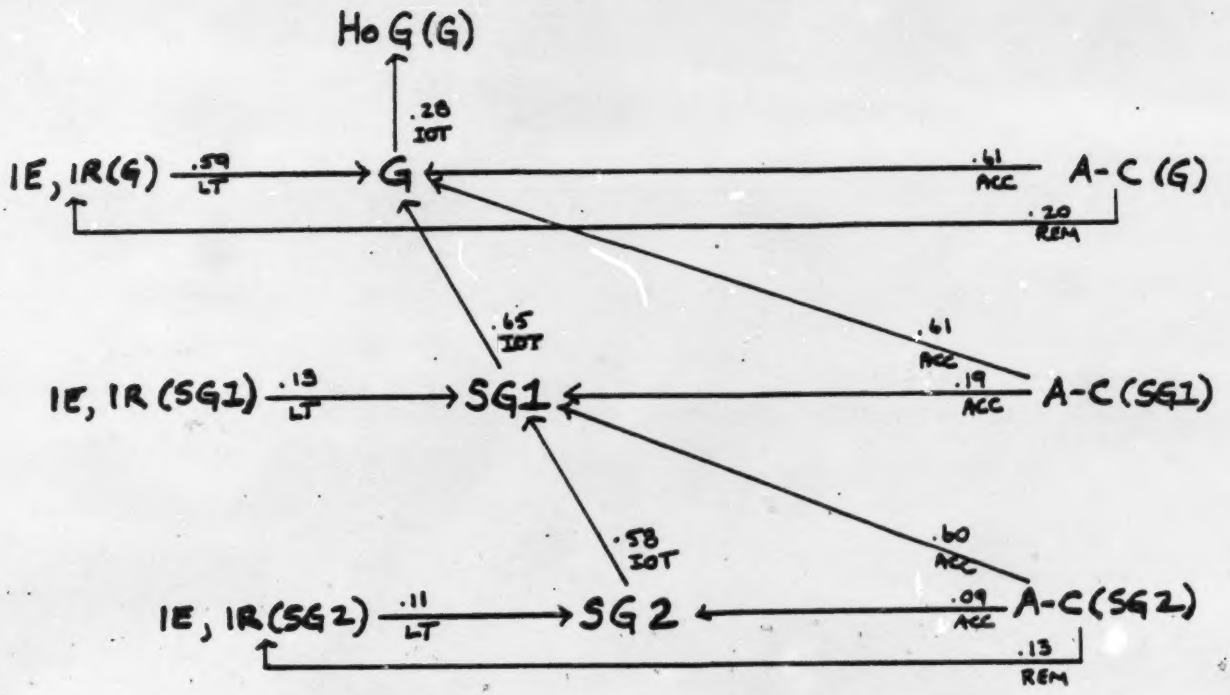
Semantic Equivalence among Goals

Embedded	Sequential
G	G1
SG1	G2
SG2	G3

Story A / Story B

Wants bike/ Wants to do Show & Tell
Wants money/ Wants to make a candle
Wants job/ Wants crayons

Figure 1.


Ho G (G)
.28
IOT
IE, IR(G)
.59
LT
G
.61
ACC
A-C (G)
.20
REM
.65
IOT
.61
ACC
IE, IR (SG1)
.13
LT
SG1
.19
ACC
A-C (SG1)
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IE, IR(SG2)
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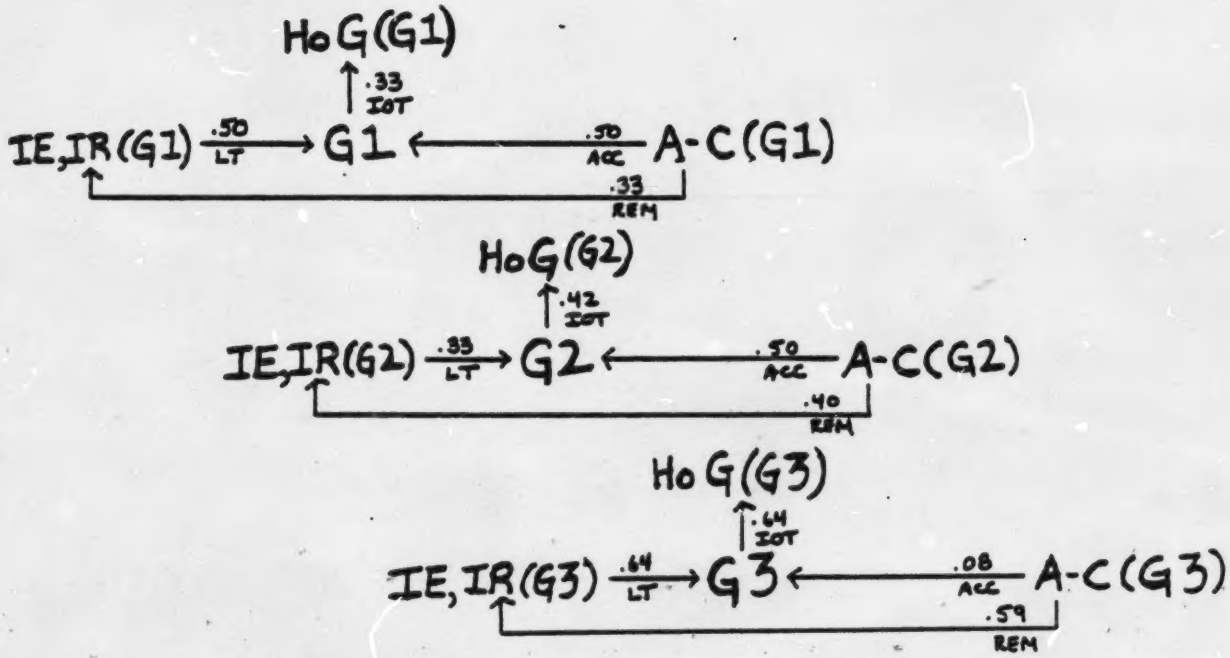
LT
SG 2
.09
ACC
A-C(SG2)
.13
REM

Figure 2.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IE,IR(G1)
.50 LT
G1
.50 ACC
A-C(G1)
.33 REM
HoG(G2)
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IE,IR(G2)
.35 LT
G2
.50 ACC
A-C(G2)
.40 REM
HoG(G3)
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IE,IR(G3)
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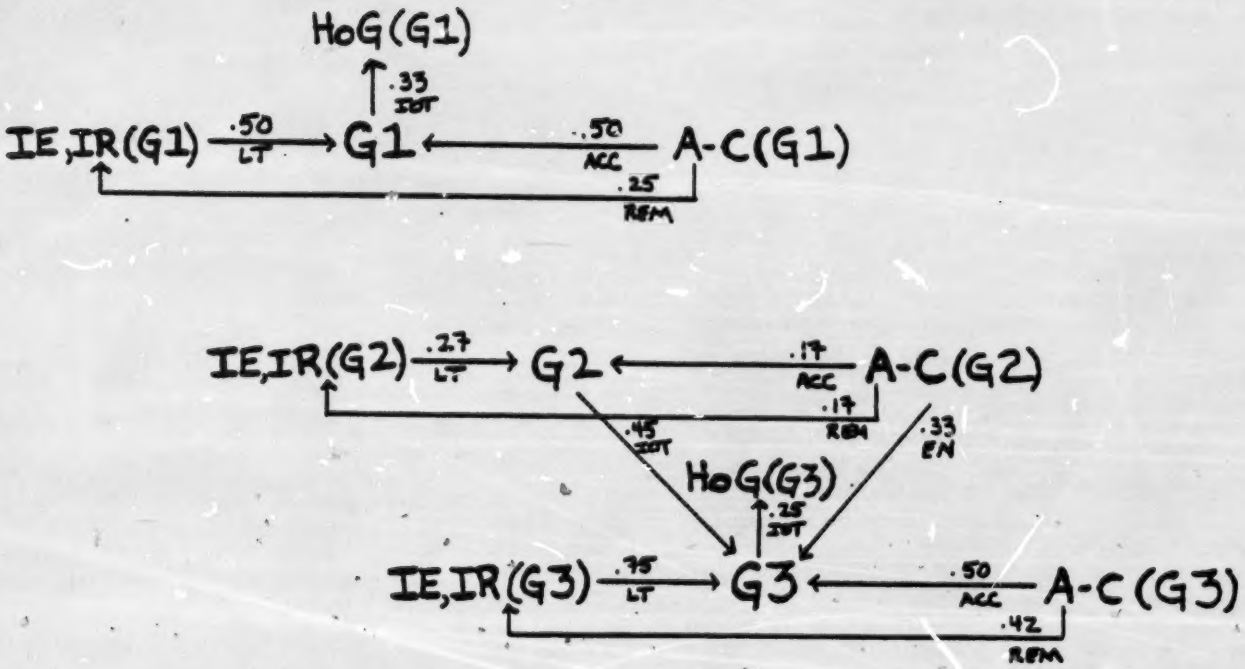
G3
.08 ACC
A-C(G3)
.59 REM

Figure 3.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ACC
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LT
G2
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ACC
A-C(G2)
.17
REM
.45
IOT
.33
EM
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LT
G3
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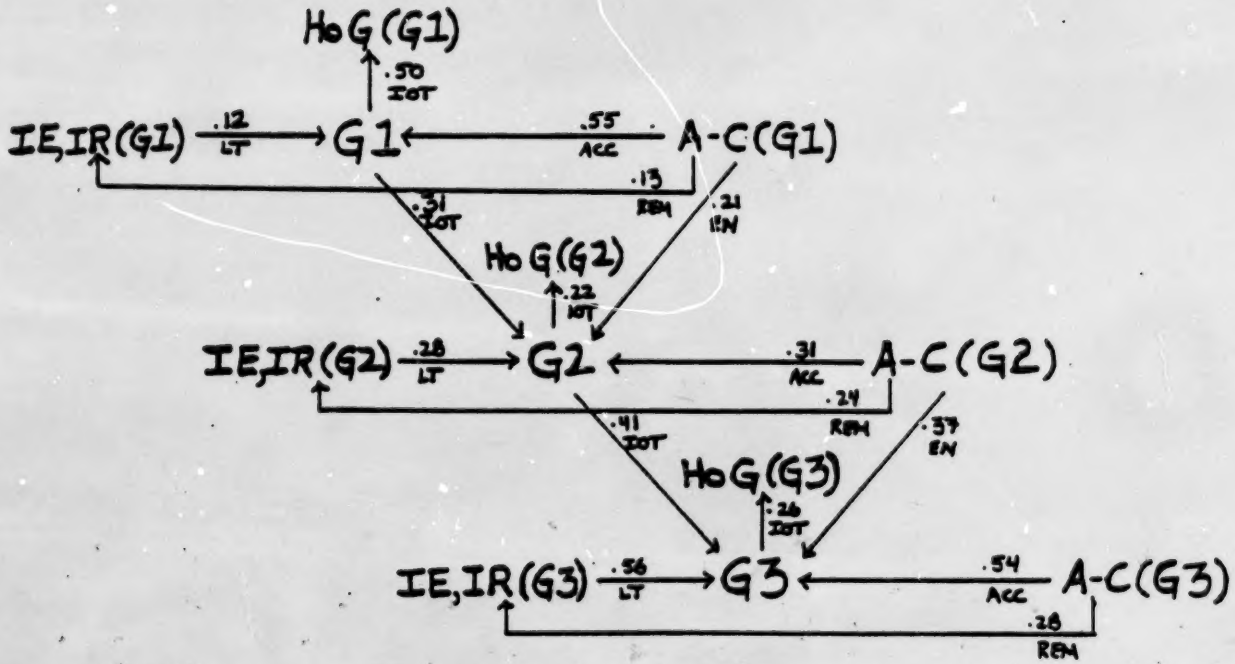
ACC
A-C(G3)
.42
REM

Figure 4.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.13
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IOT
.21
IEN
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IE,IR(G2)
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LT
G2
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ACC
A-C(G2)
.24
REM
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EN
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IOT
IE,IR(G3)
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LT
G3
.54
ACC
A-C(G3)
.28
REM

Figure 5.